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 a user data  
 relay packe

1 1. A method comprising the steps of:  
2 receiving into a fast packet network frame relay data packets, said frame relay data  
3 packets having user data in a user data field; and  
4 switching said frame relay packets within the fast packet network responsive to the user  
5 data.

1 **32. The method of claim 1, wherein said user data comprises service category data, said**  
2 **method further including the step of discriminating between a plurality of service categories**  
3 **based on the user data.**

3. The method of claim 2 further including the step of routing over the internet responsive to at least one of the service categories.

4. The method of claim 2 further including the step of routing over a virtual private network comprising an intranet responsive to at least one of the service categories.

1           5. The method of claim 2 further including the step of routing over a virtual private  
2       network, the virtual private network comprising trading partners responsive to at least one of  
3       the service categories.

6. The method of claim 2 further including the step of routing over a closed user group responsive to at least one of the service categories.

1           7. The method of claim 2 wherein the step of discriminating includes recognizing  
2   multicast data.

1 8. The method of claim 2 wherein the step of discriminating includes recognizing voice  
2 data.

1 9. The method of claim 2 wherein the step of discriminating includes recognizing video  
2 data.

1 ~~Sub 10~~ 10. The method of claim 1 wherein the user data includes an internet protocol packet.

1 11. The method of claim 10 further including the steps of:  
2 generating a fast packet address field responsive to the internet protocol packet data;  
3 and  
4 routing the internet protocol packet through the fast packet network responsive to the  
5 fast packet address field.

1 12. The method of claim 11 wherein the step of generating the fast packet address field  
2 occurs in a node located at an edge of the fast packet network.

1 13. The method of claim 11 wherein the step of generating the fast packet address field  
2 includes routing the internet protocol packet data within the fast packet network to a node  
3 capable of generating the fast packet address field responsive to the internet protocol packet  
4 data.

1 14. The method of claim 11 wherein the fast packet address is generated at a single  
2 node within the fast packet network.

1 15. The method of claim 11 wherein the fast packet network includes a plurality of  
2 nodes capable of generating the fast packet address field responsive to the internet protocol  
3 packet data and nodes not capable of generating the fast packet address field responsive to the  
4 internet protocol packet data.

1 16. The method of claim 11 wherein layer 3 data within the internet protocol packet  
2 data is utilized to generate the fast packet address field.

1 17. The method of claim 11 wherein layer 4 data within the internet protocol packet  
2 data is utilized to generate the fast packet address field.

1 18. The method of claim 17 wherein the layer 4 information is utilized to determine a  
2 quality of service.

1 19. The method of claim 18 wherein the quality of service includes an information rate.

1 20. The method of claim 18 wherein the quality of service includes priority information.

2  
3 *Sub 30* 21. The method of claim 1 wherein the fast packet network is an asynchronous transfer  
4 mode network and the fast packets are asynchronous transfer mode cells.

1 22. A method comprising the steps of:

2 receiving a plurality of frame relay packets over a permanent virtual circuit at a  
3 first node in an asynchronous transfer mode network;

4 generating an asynchronous transfer mode address based on a data field other  
5 than a data link connection identifier within the frame relay packets; and

6 routing the packets through the asynchronous transfer mode network based on

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Cont.

7 the asynchronous transfer mode address.

1 23. The method of claim 22 wherein the step of routing includes routing the packets  
2 responsive to one of a plurality of service categories.

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1 ~~24. A method comprising the step of utilizing separate routing tables within an~~  
2 ~~asynchronous transfer mode switch for each of a plurality of service categories.~~

1 ~~25. The method of claim 24 wherein the service categories are determined using internet~~  
2 ~~protocol data within a data field of a packet passed by the asynchronous transfer mode switch.~~

1 26. A method comprising the steps of:  
2 utilizing a fast packet switch to service a plurality of customers; and  
3 partitioning routing tables within the fast packet switch by customer.

1 ~~27. In a fast packet network, a method comprising the steps of:~~  
2 ~~receiving a fast packet;~~  
3 ~~comparing an address of the fast packet with a layer 3 internet protocol address~~  
4 ~~contained within the fast packet; and~~  
5 ~~determining whether the address is consistent with the layer 3 internet protocol address.~~

1 28. The method of claim 27 wherein the step of determining includes examination of  
2 a sending address or a destination address.

1 29. The method of claim 27 further including the step of discarding packets responsive  
2 to an inconsistency being detected.

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1 30. The method of claim 27 wherein the fast packet is an asynchronous transfer mode  
2 packet.

1 31. A network comprising:  
2 customer premises equipment;  
3 an asynchronous transfer mode switch coupled to and receiving from the customer  
4 premises equipment a plurality of frame relay data packets, the asynchronous transfer mode  
5 switch including address translation circuitry for translating a data link connection identifier  
6 from at least one of the frame relay data packets into an asynchronous transfer mode address,  
7 the asynchronous transfer mode address representing at least one of a plurality of virtual private  
8 networks and depending on a predetermined service category associated with a particular data  
9 link connection identifier.

1 Sub 32. A network comprising:  
2 customer premises equipment;  
3 a fast packet switch coupled to the customer premises equipment with at least one  
4 permanent virtual circuit and receiving a plurality of frame relay data packets, the fast packet  
5 switch including address translation circuitry for translating user data within at least one of the  
6 frame relay data packets into a fast packet address.

1 33. The network of claim 32 wherein the translation circuitry is responsive to a plurality  
2 of different service categories.

1 Sub 34. The network of claim 33 wherein the translation circuitry is responsive to internet  
2 protocol data within the frame relay data packets.

B7 Cont. 1 35. The network of claim 34 wherein the translation circuitry is responsive to layer 3  
2 internet protocol data.

1 36. The network of claim 33 wherein the translation circuitry is configured to determine  
2 a quality of service responsive to layer 4 data.

1 37. The network of claim 32 wherein the fast packet switch is an asynchronous transfer  
2 mode protocol based switch.

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1 Sub 38 38. An asynchronous transfer mode switch comprising translation circuitry for  
2 translating a plurality of frame relay packets into asynchronous transfer mode cells, the  
3 asynchronous transfer mode switch assigning an address based on information contained within  
4 a user data field of the frame relay packets.

1 39. The asynchronous transfer mode switch of claim 38 wherein the translation circuitry  
2 includes a separate routing table for each of a plurality of different service categories.

1 40. The asynchronous transfer mode switch of claim 38 wherein the translation circuitry  
2 includes a separate routing table for each of a plurality of different customers.

1 Sub 39 39. The asynchronous transfer mode switch of claim 39 wherein the translation circuitry  
2 determines the different service categories using layer 3 internet protocol data.  
3

4 42. The asynchronous transfer mode switch of claim 39 wherein the translation circuitry  
5 determines the different service categories using layer 4 internet protocol data.

1 43. An asynchronous transfer mode switch comprising translation circuitry for  
2 translating a plurality of frame relay packets into asynchronous transfer mode cells having an

3 address responsive to layer 3 internet protocol data contained within a user data field of the  
4 frame relay packets

1 44. An asynchronous transfer mode switch comprising translation circuitry for  
2 translating a plurality of frame relay packets into asynchronous transfer mode cells having an  
3 address responsive to layer 4 internet protocol data contained within a user data field of the  
4 frame relay packets

1 45. A fast packet network having a node, said node including error checking circuitry  
2 for determining routing errors by comparing an address of a fast packet with layer 3 internet  
3 protocol data contained within the fast packet.

1 ~~46. A multi-layer asynchronous transfer mode switch having separate routing tables for~~  
2 ~~each of a plurality of service categories.~~

1 47. The multi-layer switch of claim 46 wherein the routing tables are separated based  
2 on customer.

1 48. The multi-layer switch of claim 46 wherein the routing tables are separated based  
2 on data link connection identifiers.

1 49. A network comprising:

2 means for receiving a plurality of frame relay frames, each frame relay frame  
3 having a data link connection identifier, wherein at least one data link connection identifier is  
4 associated with a service category and

5 means for associating a data link connection identifier with a virtual network path  
6 according to the service category with which the data link connection identifier is associated.

1 ~~50. A method comprising the steps of:~~  
2 receiving a plurality of frame relay frames at an asynchronous transfer mode  
3 switch in a mesh network; and  
4 transmitting at least a portion of the frames over at least one of a plurality of  
5 virtual networks, each of said virtual networks representing different service classes, each of  
6 ~~said service classes being associated with a data link connection identifier.~~

1 ~~Sub 319~~ 51. A method comprising the steps of:  
2 receiving a plurality of frame relay frames at an asynchronous transfer mode  
3 switch in a mesh network; and  
4 transmitting at least a portion of the frames over one of a plurality of virtual  
5 networks responsive to internet protocol information contained in at least one of the frame relay  
6 frames.

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